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One day in my thirtieth year I was shown how our world would end. Not the earth, not—so far as I knew then, or for the next twenty years--all humanity or life, but the destruction of most cities and people in the Northern Hemisphere.

What I was handed, in a White House office, was a single sheet of paper with some numbers and lines on it. It was headed Top Secret—Sensitive: For the President's Eyes Only. The "Eyes Only" designation meant that, in principle, it was to be seen and read only by the person to whom it was explicitly addressed, in this case the president himself.

In practice this usually meant that it would also be seen, at a minimum, by one or more secretaries and assistants as well: a handful of people, sometimes somewhat more, rather than the scores to hundreds who would normally see copies of a Top Secret document. Later, working in the Pentagon as the Special Assistant to the Assistant Secretary of Defense, I often found myself reading copies of cables and memos marked Eyes Only though I was not an addressee, nor for that matter was my boss. But I had never before seen one marked For the President's Eyes Only, and I never did again.

The Deputy Assistant to the President for National Security, Bob Komer, a friend and colleague, showed it to me. A cover sheet identified it as the answer to President Kennedy of a question he had addressed to the Joint Chiefs of Staff a week earlier. Komer showed it to me because I had drafted the question, which Komer had sent in the president's name.

The question to the JCS was: "If your plans for general [nuclear] war are carried out as planned, how many people will be killed in the Soviet Union and China?"

Their answer was in the form of a graph. The vertical axis was the number of deaths, in millions. The horizontal axis was time, indicated in months. The graph was a straight line, starting on the vertical axis at time zero—the number of immediate deaths expected within hours of our attack—and slanting upwards to a maximum at six months, an arbitrary cut-off for the deaths that would accumulate over time from initial injuries and from fall-out radiation.

The lowest number, at the left of the graph, was 275 million deaths. The number at the right-hand side, at six months, was 325 million.

[GRAPH]

That same morning, with Komer's approval, I drafted another question to be sent to the Chiefs over the president's signature, asking for a total break-down of global deaths from

our own attacks, to include not only the whole Sino-Soviet bloc but all other countries that would be affected by fall-out. Again their answer was prompt. Komer showed it to me about a week later, this time in the form of a table, with explanatory foot-notes.

In sum, another hundred million deaths, roughly, were predicted in East Europe. There might be a hundred million deaths from fall-out in West Europe, depending on which way the wind blew (a matter, largely, of the season). Another hundred million, at least, from fall-out in countries adjacent to the Soviet Bloc and China, most of them neutral: Finland, Austria, Afghanistan, India, Japan and others. Finland, for example, would be wiped out by fall-out from U.S. ground-burst explosions on the Soviet submarine pens at Leningrad.

The total death-toll as calculated by the Joint Chiefs, from a US first strike aimed primarily at the Soviet Union, would be roughly six hundred million dead. A hundred Holocausts.

I remember what I thought when I held the single sheet with the graph (above) on it. I thought, this piece of paper should not exist. It should never have existed. Not in America. Not anywhere, ever. It was evil beyond any human project that had ever existed. There should be nothing on earth, nothing real, that it referred to.

But there was, all right. I knew what it dealt with was real. I had seen some of the bombs myself, Mark 12A H-bombs with an explosive yield each of 1.1 megatons—each, half the total explosive power of all the bombs of World War II-- slung under single-pilot F-100 fighter-bombers on alert at Kadena airbase on Okinawa, and at Kunsan in South Korea, ready to take off on ten minutes notice. On one occasion I had laid my hand on one of these, not yet loaded on a plane. On a cool day, the smooth metallic surface of the bomb was warm, from the radiation within: a body warmth.

At Kadena, the pilots weren't in the alert planes or in the hut on the strip; they were allowed to be elsewhere, at the PX or in their quarters, each with his individual jeep and driver, because they practiced the alert at least once a day. The officer in charge told our research group, which was there to study and improve command and control for the Commander in Chief Pacific (CINCPAC), we could choose the time for that day's rehearsal. When our leader said, later, "OK, now," the klaxons sounded all over the area and jeeps appeared on all the roads leading to the strip, rushing around curves, pilots leaping out as they reached the strip and scrambling into the cockpits, still tightening their helmets and gear. Engines starting in ten planes, almost simultaneously. Ten minutes.

They didn't taxi or take off, as SAC-- Strategic Air Command--planes did in their daily rehearsals (their crews stayed on the strip throughout their watch), because the Mark-12 thermonuclear weapons were not designed to be slung outside a tactical plane like the F-100 without a bomb-bay, they weren't safe enough. If the planes taxied down the runway



every day in practice, and one plane had collided with another or had some other mishap that led to an impact involving a bomb, the high explosive inside it had a small chance of exploding, spreading radioactivity. There might even have been a partial nuclear detonation, on the scale of the Hiroshima explosion, though the chance of that was still smaller. So the pilots just revved their engines in place, to meet the ten-minute deadline.

These were tactical fighter-bombers, with limited range. There were more than a thousand of them in range of Russia and China, armed with H-bombs, on strips like this or on aircraft carriers surrounding the Sino-Soviet Bloc (as we still thought of it in 1961, though China and the Soviets had actually split apart a couple of years before that). Each of them could devastate a large city with one bomb. For a larger metropolitan area, it might take two. Yet SAC, which did not command these planes (they were under the control of theater commanders), regarded these tactical, theater forces as so unreliable and insignificant as a factor in all-out nuclear war that SAC planners had not until this year included them in their calculations of the outcome of attacks in a general war. In fact, the calculations above still did not include the effects of hundreds of bombs from carrier planes, since the carriers could not be assumed to be in position to launch initial attacks.

Before this year, planners at the Joint Strategic Target Planning Section at SAC headquarters counted for deterrence and war-fighting only on the attacks by the heavy bombers and ICBMs commanded by SAC, along with Polaris sub-launched missiles. In the bomb-bays of the SAC planes were thermonuclear bombs much larger than the Mark-12s I saw in Okinawa. Many were five or ten megatons in yield. A relative few had the explosive power of twenty megatons: each bomb the equivalent of twenty million tons of TNT--ten times the total tonnage we dropped in World War II--more power than all the bombs and shells exploded in all the wars of human history.

These intercontinental bombers and missiles had come to be stationed almost entirely in the continental US, though they might be deployed to forward bases outside it in a crisis. A small force of B-52's was constantly airborne. Many of the rest were on alert. I had seen a classified film of an incredible maneuver in which a column of B-58's—smaller than B-52's but still intercontinental heavy bombers—taxied down a runway and then took off simultaneously, rather than one at a time. The point—as at Kadena and elsewhere--was to get in the air and away from the field as fast as possible, on warning of an imminent attack, before an enemy missile might arrive.

In the film these heavy bombers, each big as an airliner, sped up in tandem as they raced down the airstrip, one behind the other so close that if one had slackened its pace for an instant the plane behind, with its full fuel load and its multiple thermonuclear weapons, would have rammed into its tail. Then they lifted together, like a flock of birds startled by a gunshot. It was an astonishing sight; it was beautiful.

In the time it would normally have taken for a single plane to take off, a squadron of planes would be airborne, on their way to their preassigned targets. These included, along with military sites, nearly every city in the Soviet Union and China.

On carriers, smaller, tactical bombers would be boosted on takeoff by a catapult, a kind of large slingshot. But since the general nuclear war-plan, as I knew, called for takeoff around the world of as many U.S. planes and missiles as were ready at the time of the execute order--as near-simultaneously as possible--to attack targets that were all assigned in prior planning, the preparations contemplated one overall, preplanned and inflexible global attack as if the vehicles with their warheads were launched by a single catapult. As if David had flung all four of his smooth stones (now, closer to four thousand) at one time from his sling.

The rigidity of the single, coordinated plan meant that its underlying "strategy" amounted to nothing more than a vast trucking operation to transport thermonuclear warheads to Soviet and Chinese cities and military sites. The great majority of targets were military, since all the cities could be destroyed by a small fraction of the attacking vehicles, but virtually all of the attacks killed civilians as well, by blast, fire and fallout. Thus one of the principal expected effects of this plan was summarized on the piece of paper I held that day in the spring of 1961. It was the extermination of over half a billion people.

I did still believe at that time, along with the American public, that the predominant intent of this planning and deployment and rehearsals was to *deter* Soviet attacks, not only nuclear but (the public wasn't clear on this) large conventional, non-nuclear aggression in Europe. Thus, the story went, it was all designed to prevent such Soviet attacks from ever taking place. I accepted the proposition that this global machine had been constructed so that it would never be set in motion: in hopes, it was often said, that it would never be used. (The official motto of SAC, on display at all its bases, was "Peace Is Our Profession.")

To be sure, I already knew, perhaps better than any other civilian, how the machine might go off "by accident": by false alarm, miscalculation, miscommunication, unauthorized action. Studying that, in the field, was my special mission in a research project for the Commander-in-Chief Pacific (CINCPAC), and later as a specialist in "command and control" of nuclear weapons.

Moreover, I had learned in the Pacific one of the most sensitive secrets in the system. To forestall the possibility that our retaliatory response might be paralyzed either by a Soviet attack on Washington or by presidential incapacity, President Eisenhower had secretly delegated to theater commanders the authority to launch nuclear operations in a crisis, either in the latter event (Eisenhower had suffered both a stroke and a heart attack in office) or if communications were cut off with Washington.

I had also learned that CINCPAC, at least, had likewise delegated that authority downward in his command, under like conditions. That put many fingers on the button if communications went out between Washington and Hawaii, or Hawaii and the Western Pacific. That happened on average, for each of these links, part of every day. It magnified greatly the possibilities listed above for "inadvertent, accidental" nuclear war.



I had informed the incoming Special Assistant to the President for National Security, McGeorge Bundy, of both of these closely-held facts, among other things, in January, 1961. That briefing, arranged by the Office of the Assistant Secretary of Defense (International Security Affairs), was in part the reason I was in a position to draft questions for the White House soon after.

Moreover, it was a commonplace in the circles where I worked that deterrence was not foolproof, it might fail. It was not impossible that the Soviets would attack despite our best efforts to dissuade them. What to do then was a subject for highly classified debate. On this point the official plans were unequivocal, simple in intent: the demolition of the Sino-Soviet Bloc, its military and war-supporting resources, its industry and population. But there was some discussion of alternative targeting, especially if there were tactical warning of the attacks before all or most Soviet vehicles had been launched. In particular, colleagues at Rand and some in the Service staffs proposed a focus, if deterrence failed, not on revenge but on limiting subsequent damage to the U.S., by attacking in retaliation offensive military targets rather than cities. There would still be massive "collateral damage" to civilians from attacks near cities and from fall-out, but radically less than in the existing plans.

In contrast to that, the current operational plan called for hitting cities in initial attacks even in a U.S. first strike. A U.S. "preventive war," out of the blue, was ruled out on policy grounds. But a U.S. first strike, initiating nuclear attacks on the homeland of its superpower adversary, as an escalation of a regional conflict or as preemption of an impending Soviet escalation, was basic to JCS planning. And the current plans, approved by President Eisenhower, called for initiating such an all-out U.S. attack on the Sino-Soviet Bloc, including all its cities, under any and all circumstances of armed conflict with Soviet forces, anywhere, not necessarily involving a Soviet attack on NATO territory.

I opposed (as did some others, including some Air Force officers) the strategic logic or morality of deliberately targeting cities with nuclear weapons in those circumstances. But I supposed it to be anachronistic, a carry-over of World War II Allied practice and doctrine from the pre-nuclear era. I presumed that a kind of institutional inertia was at work, and that military planners had simply failed to face up to the implications of pursuing that policy in the thermonuclear era.

I had been led to believe this by officers I worked with in the planning staff of the Air Force. They were convinced that no one, either in the Joint Staff or the Air Staff, had ever calculated the overall human consequences of carrying out their plans. Thus, I had drafted the question about the deaths to be expected from executing the war-plans in the belief that the Joint Staff of the JCS did not have an immediate answer to it.

Asking them for a quick estimate was meant to embarrass them into admitting their ignorance. The point of this was to gain bureaucratic leverage in an effort under the secretary of defense to get the plans changed. Thinking that the military planners had never calculated or fully confronted the overall damage to humans of carrying out their

operational plans, I took it for granted that they would be more than reluctant to present their civilian superiors with a realistic estimate of the total effects.

I limited the question initially to deaths in the Soviet Union and China alone, rather than the whole Bloc or the world, because I wanted to avert their stalling for time alleging a need to calculate effects in, say, Albania, or far-flung reaches of the globe. I figured that they would either have to acknowledge that they weren't ready to predict population effects even for the Soviet Union itself, or they would gin up a hasty estimate that could be shown to be absurdly low. Either response would put them off balance in defending their current plans.

But my expectations were wrong on all counts. The Chiefs were embarrassed neither by the questions, nor by their answers. That was the surprise: that, and the answers themselves. Their staff had obviously made the calculations already, and they showed no hesitation in reporting them, unmodified and without apology. When I broadened the request in light of that, their next answers came just as quickly. The implications of the graph on the piece of paper I held in my hand made me dizzy.

I would have thought it self-evident that there were limits to the potential destruction of enemy lives and society—let alone, damage to allies and neutrals from our own attacks--that anyone could justify by requirements either for deterrence or for limiting damage to ourselves. But the numbers on the graph and the subsequent table told me something different. And they told me at the same time that hopes that the alert forces on either side might never be used were ill-founded.

The American officials who had built and maintained this machine *knew*, it turned out, that it would kill more than half a billion people if they set it in motion, as they were prepared to do in a wide variety of circumstances. And they were unabashed to report that to a president, assuming—correctly, as it turned out--that he would not respond by firing them in disgrace and ordering the machine to be dismantled. People like that, in our country or another—the conclusion seemed inescapable--would not fail someday to pull the switch in circumstances like those contemplated in these plans, circumstances that, later that same year, threatened to arise over Berlin and which came within a hand's-breadth of being realized a year later in Cuba.

I did, after all, know many of these people, though not, apparently, as well as I had thought. What was staggering was precisely that I knew they were not evil, in any ordinary or extraordinary sense. They were normal Americans. I was sure they were not different, surely not worse, than the people in Russia who were doing the same work, or those in other nuclear weapons states in the future, or the people who would sit at the same desks in later U.S. administrations. I liked most of the ones I knew. Not only the physicists at Rand who designed bombs and the economists who speculated on strategy (like me), but the colonels who worked on these very plans, the ones I consulted with during the workday and drank beer with in the evenings.

That chart set me the problem--which I have pondered nearly half a century--of understanding my fellow humans: in the light of this potential for self-annihilation of our species and of most others. This likelihood. A certainty? Some days I think so, as I did that morning in the White House. Other times not, or I would not have lived as I have and still do, and I would not be writing this book.